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| (21)出願番号<br>特願平4-194760    | (71)出願人<br>新王子製紙株式会社<br>東京都中央区銀座4丁目7番5号                |
| (22)出願日<br>平成4年(1992)6月29日 | (72)発明者<br>池沢 秀男<br>東京都江東区東雲1丁目10番6号王子製紙<br>株式会社商品研究所内 |
|                            | (72)発明者<br>渡辺 忍<br>東京都江東区東雲1丁目10番6号王子製紙<br>株式会社商品研究所内  |
|                            | (74)代理人<br>弁理士 奥村 茂樹                                   |

(54)【発明の名称】 拭き布の製造方法

(57)【要約】

【目的】 吸水性や拭き取り性に優れた拭き布を合理的に製造する方法を提供する。

【構成】 多数の長繊維が集積されてなる長繊維ウェブを準備する。長繊維の繊度は1~4デニールで、長繊維ウェブの坪量は、5~30g/m<sup>2</sup>が好ましい。長繊維ウェブは、点融着区域を多数持つ長繊維不織布であるのが好ましい。この長繊維ウェブの表面に、湿潤引張強さが0.6kqfを超えて1.5kqf以下の範囲である紙シートを積層する。ここで言う湿潤引張強さは、JIS P 8135に示された方法で25mm巾の試験片について測定したものである。紙シートの坪量は、10~100g/m<sup>2</sup>が好ましい。長繊維ウェブの坪量と紙シートの坪量の比は、長繊維ウェブ/紙シート=1/1~19が好ましい。長繊維ウェブと紙シートの積層物に、紙シートの表面から長繊維ウェブ側に向けて、高圧水柱流を施す。この結果、長繊維と紙シートを構成しているバルブ繊維とが均一に絡合した拭き布を得ることができる。

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## 【特許請求の範囲】

【請求項1】 多数の長繊維が集積されてなる長繊維ウェブの表面に、JIS P8135に示された方法で25mm巾の試験片について測定した湿润引張強さが、0.6kgfを超えて1.5kgf以下の範囲である紙シートを積層した後、該紙シートの表面から長繊維ウェブ側に向けて高圧水柱流を施すことにより、該紙シートを構成するバルブ繊維と該長繊維とを絡合させることを特徴とする拭き布の製造方法。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、使い捨て手拭き、ウェットティシュー、ワイパー、使い捨て雑巾等の拭き布の製造方法に関するものである。

## 【0002】

【従来の技術】 従来より、使い捨て手拭き等の拭き布として、バルブ繊維を嵩高に集積してなる乾式バルブシートに、水や薬剤等をしみこませたものが使用されている。しかし、乾式バルブシートは、水や薬剤等をしみこませた後の濡れ強度が低く、使用中に破れやすいという欠点があった。

【0003】 一方、親水性繊維であるレーヨン繊維を集積した後、レーヨン繊維相互間をゴム系結合剤で結合した不織布に、水等をしみこませたものも使用されている。この拭き布は、レーヨン繊維相互間が結合されているので、高い濡れ強度を示すものである。しかし、拭き布にゴム系結合剤が含有されているため、異臭がするという欠点があった。また、ゴム系結合剤のざらざらとした手触りのため、拭き布の使用感が悪いという欠点もあった。このため、ゴム系結合剤を使用せずに、レーヨン繊維相互間を絡合させた不織布を使用するという試みも行なわれている。レーヨン繊維相互間の絡合には、レーヨン繊維が集積されたウェブに水柱流を施すことが考えられる。しかしながら、水柱流による絡合を十分に付与するためには、レーヨン繊維の集積量が多くなければならないということがあった。即ち、レーヨン繊維の集積量の少ないウェブは、レーヨン繊維相互間に比較的大きな間隙が形成されており、水柱流を施しても、その水柱流はレーヨン繊維に衝突せずに、その間隙を通して容易にウェブをすりぬけるのである。即ち、レーヨン繊維に運動エネルギーを十分に与えないため、レーヨン繊維が十分に運動せず、その結果レーヨン繊維相互間が絡合しないのである。従って、レーヨン繊維相互間を十分に絡合させようとすると、レーヨン繊維の集積量を多くして、レーヨン繊維相互間に形成される繊維間隙を小さくする必要があるのである。しかし、レーヨン繊維の集積量を多くすると、得られる拭き布の厚みが厚くなり、使い捨て手拭き等として使用するには、過剰品質になるとという欠点があった。

## 【0004】

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【発明が解決しようとする課題】 このため、本件出願人はレーヨン繊維等の集積量が少なくとも、水柱流による絡合が可能となる技術を検討した。その結果、レーヨン繊維等が集積されてなるウェブにおいて、レーヨン繊維相互間の比較的大きな間隙を塞いでおくことが有効であることに想い至り、特願平3-204875号に係る発明を提案した。この発明は、レーヨン長繊維等の長繊維が集積されてなるウェブの表面に薄葉紙を積層して、高圧水柱流を施すことを特徴とする拭き布の製造方法に関するものである。この方法によって、薄葉紙を構成するバルブ繊維と長繊維とが良く絡合し、更にバルブ繊維を介して長繊維相互間も良く絡合し、吸水性が良好で、且つ湿润強度の高い拭き布が得られるのである。

【0005】 しかしながら、この方法によって、拭き布を製造した場合、製造中に各種のトラブルが発生した。例えば、薄葉紙に高圧水柱流を施したときに、薄葉紙が著しく破壊され、バルブ繊維が空中に飛散するということがあった。このトラブルにより、薄葉紙を構成するバルブ繊維が、長繊維と均一に絡合せず、バルブ繊維が存在しない箇所を持つ、不均一な拭き布しか得られないという欠点が発生した。また、空中にバルブ繊維が飛散するため、得られる拭き布中における、バルブ繊維の量が少なくなり、吸水性が低下するということもあった。更に、使用後の高圧水柱流は回収されて、フィルター材で通過され、その水を高圧水柱流として再使用するわけであるが、薄葉紙が著しく破壊されたり或いは空中にバルブ繊維が飛散すると、高圧水柱流を回収する際に、その中にバルブ繊維が混入し、フィルター材の目詰まりが激しく、長期間に亘る連続操業が行なえなくなるという欠点があった。また、高圧水柱流を回収しないで、そのまま廃液として排出する場合にも、バルブ繊維が混入していると、廃液による環境破壊を惹起するという恐れもある。なお、このような欠点は、レーヨン等のステープル繊維にバルブを配合した後、カード法によってステープル繊維を開織すると共にその内部にバルブを含有した繊維ウェブを形成し、その後高圧水柱流を施して、ステープル繊維相互間の絡合をバルブ繊維の作用によって緊密にする方法によっても生じるものである。何故なら、バルブ繊維はその繊維長が短いために、カード法によって開織する際に、バルブ繊維が飛散することがあり、また、繊維ウェブ内部に大量の自由に運動しやすいバルブ繊維を含有させると、高圧水柱流で処理する際に、バルブ繊維が繊維ウェブ中から流失するからである。

【0006】 本発明者等は、上記の欠点を解決しようとして種々研究を行なった。その結果、使用する薄葉紙として、湿润引張強さが0.04~0.6kgfである紙シートを採用すれば、上記の欠点を解決しうることを見出し、特願平4-89650号に係る発明を提案した。この発明によれば、紙シートと長繊維ウェブとを積層して高圧水柱流を施しても、紙シートが著しく破壊されたり、或いは紙シ

ートを構成するバルブ繊維が飛散したりすることを抑制し、もってバルブ繊維と長纖維とが比較的均一に絡合されると共に、使用した紙シート中のバルブ繊維が有効に長纖維と絡合された拭き布を得ることができるのである。更に、拭き布の製造工程において用いる高圧水柱流を回収する際に、その中にバルブ繊維が混入する割合を減少させることによって、拭き布の製造を長期間に亘って連続操業しうるのである。

## 【0007】

【課題を解決するための手段】本発明者等が、その後更に研究を進めた結果、湿潤引張強さが0.6kgfを超える紙シートを採用した場合にも、特願平4-89650号に係る発明と同様に、紙シートが著しく破壊されたり、或いは紙シートを構成するバルブ繊維が飛散したりすることを抑制できることを見出し、本発明に到達したのである。即ち、本発明は、多数の長纖維が集積されてなる長纖維ウェブの表面に、JIS P 8135に示された方法で25mm巾の試験片について測定した湿潤引張強さが、0.6kgfを超えて1.5kgf以下の範囲である紙シートを積層した後、該紙シートの表面から長纖維ウェブ側に向けて高圧水柱流を施すことにより、該紙シートを構成するバルブ繊維と該長纖維とを絡合させることを特徴とする拭き布の製造方法に関するものである。

【0008】まず、本発明においては、多数の長纖維が集積されてなる長纖維ウェブを準備する。ここで、長纖維としては、従来公知の長纖維を使用することができ、例えばレーヨン長纖維、ポリオレフィン系長纖維、ポリエステル系長纖維、ポリアミド系長纖維、ポリアクリル酸エステル系長纖維等を使用することができる。本発明において、長纖維を使用する理由は、長纖維よりなる長纖維ウェブは、短纖維よりなる短纖維ウェブよりも、纖維間が絡合している場合、引張強度や形態安定性に優れているからである。また、長纖維の纖度は、1~4デニールであるのが好ましい。長纖維の纖度が4デニールを超えると、長纖維ウェブの柔軟性が低下し、拭き布として使用した場合の使用感が低下する傾向が生じる。逆に、長纖維の纖度が1デニール未満になると、長纖維の製造条件等が厳密になって、長纖維、ひいては長纖維ウェブを高速度で製造しにくくなる傾向が生じる。また、長纖維ウェブの坪量は、5~30g/m<sup>2</sup>であるのが好ましい。長纖維ウェブの坪量が30g/m<sup>2</sup>を超えると、紙シートと長纖維ウェブとの積層物に、紙シートから長纖維ウェブ側に向けて高圧水柱流を施しても、紙シートを構成するバルブ繊維が、長纖維ウェブの裏面（紙シートと当接していない面）に移動しにくくなり、得られる拭き布の片面にのみバルブ繊維が偏在した状態となって、バルブ繊維の少ない面における吸水性が低下する傾向が生じる。逆に、長纖維ウェブの坪量が5g/m<sup>2</sup>未満になると、長纖維ウェブの形態安定性が低下し、得られる拭き布の湿潤強度が低下する傾向が生じる。更に、長纖維相

互間の間隙が大きくなつて、高圧水柱流を施したときに、その間隙からバルブ繊維が流出してしまい、使用後の高圧水柱流を回収した場合、その中にバルブ繊維が大量に混入する恐れが生じる。なお、本発明において使用する長纖維ウェブは、長纖維相互間が自己融着した、いわゆる長纖維不織布であつてもよいし、また長纖維相互間が結合していないフリース状の長纖維フリースであつてもよい。特に、前者の長纖維不織布のうちでも、長纖維相互間が自己融着した点融着区域が、散点状に多数配置されたものを使用するのが好ましい。この理由は、長纖維相互間が自己融着している点融着区域を持つため、形態安定性に優れると共に、点融着区域以外の区域においては長纖維相互間が自己融着されておらず、自由な状態で集積されているため、柔軟性に優れ、且つバルブ繊維と良好に絡合しやすいからである。

【0009】以上のようにして準備した長纖維ウェブの表面に、紙シートを積層する。本発明で重要なことは、この紙シートとして、ある特定の湿潤引張強さを持つものを使用する点にある。即ち、紙シートとして、JIS P 8135に示された方法で25mm巾の試験片について測定した湿潤引張強さが、0.6kgfを超えて1.5kgf以下の範囲である紙シートを使用する必要がある。特に、好ましくは、湿潤引張強さが0.6kgfを超えて1.2kgf以下の範囲である紙シートを使用するのがよい。この紙シートは、湿潤引張強さが0.6kgf以下である紙シートに比べて、高圧水柱流によるバルブ繊維の単離及び運動が抑制される傾向にあるため、以下に示すように、高圧水柱流の処理条件を厳しくすることが好ましい。即ち、高圧水柱流を噴出するノズルの本数を増加させたり、高圧水柱流の噴出圧力を増加させたり、或いは移動する紙シートに高圧水柱流を噴出させる際、その紙シートの移動速度を低下させて、高圧水柱流による処理時間を長くすることが好ましい。紙シートの湿潤引張強さが1.5kgfを超えると、高圧水柱流を施しても、それによって紙シートを構成するバルブ繊維が運動しにくく、バルブ繊維と長纖維とが絡合しにくくなるばかりでなく、高圧水柱流によるバルブ繊維の単離が不十分となって、得られる拭き布の柔軟性が大幅に低下するため、好ましくない。また、高圧水柱流によって紙シートを構成するバルブ繊維の単離が不十分になると、高圧水柱流が紙シートを貫通しにくくなり、紙シート上に水がプール状となって滞留し、紙シートと長纖維ウェブとの積層物に付与される高圧水柱流のエネルギー低下をもたらす。更に、紙シート上に水がプール状となって滞留していると、高圧水柱流によって、その滞留している水が周囲に飛び散り、高圧水柱流を付与する前又は付与した後の工程でバルブを含んだ水が付着するため、得られる拭き布の地合いが低下するので、好ましくない。紙シートの湿潤引張強さを特定の範囲にする方法は、特に限定するものではないが、例えばポリアミド・エビクロルヒドリン樹脂やその変性物、ポリアミン

・エピクロルヒドリン樹脂、メラミン樹脂或いは尿素樹脂等の一般的な湿润紙力増強剤を配合しても良い。

【0010】使用する紙シートの坪量は、任意に決定しうる事項であるが、特にJIS P 8124に示された方法で測定した坪量が $10\sim100\text{g}/\text{m}^2$ である紙シートを使用するのが好ましい。紙シートの坪量が $10\text{g}/\text{m}^2$ 未満であると、パルプ繊維の絶対量が少なく、得られる拭き布に十分な吸水性や保水性を与えてなくなるという傾向が生じる。逆に、紙シートの坪量が $100\text{g}/\text{m}^2$ を超えると、パルプ繊維の絶対量が多くて、紙シートに高圧水柱流を施しても、一本一本のパルプ繊維に長纖維と絡合しうる程度の運動量を与えにくくなる傾向が生じる。更に、パルプ繊維の絶対量が多くて、得られる拭き布の柔軟性が低下する傾向が生じる。

【0011】紙シートを構成するパルプ繊維としては、針葉樹及び広葉樹木材をクラフト法、サルファイト法、ソーダ法、ポリサルファイト法等で蒸解した化学パルプ繊維、又はグランドパルプ繊維、サーモメカニカルパルプ繊維等の機械パルプ繊維を、晒若しくは未晒の状態で、単独で又は混合して使用することができる。針葉樹パルプ繊維と広葉樹パルプ繊維の重量配合比は、好ましくは、針葉樹パルプ繊維/広葉樹パルプ繊維=100~20/0~80、最も好ましくは100~40/0~60の範囲である。広葉樹パルプ繊維が80重量%を超えると、高圧水柱流によるパルプの消失量が増加するばかりでなく、絡合後のシートの柔軟性が低下する傾向となる。また、本発明に使用される紙シートの密度（JIS P 8118に示された方法で測定）は、 $0.6\text{g}/\text{cm}^3$ 以下であるのが好ましい。紙シートの密度が $0.6\text{g}/\text{cm}^3$ を超えると、紙シートの上から高圧水柱流を施した場合に、パルプ繊維の運動が抑制され、長纖維とパルプ繊維との絡合が十分でなくなるばかりでなく、得られる拭き布の柔軟性が低下する傾向が生じる。

【0012】この紙シートは、予め準備した長纖維ウェブ表面に積層される。この際、長纖維ウェブの坪量と紙シートの坪量の比は、以下のようにするのが好ましい。即ち、長纖維ウェブの坪量と、JIS P 8124に示された方法で測定した紙シートの坪量の比が、長纖維ウェブ/紙シート=1/1~19となるようにするのが、好ましい。長纖維ウェブ/紙シート=1/1未満となると、長纖維の量に対して、相対的にパルプ繊維の量が少くなり、得られる拭き布の吸水性や保水性が低下する傾向が生じる。また、長纖維に対して、廉価なパルプ繊維の量が少なくなることによって、得られる拭き布自体が高価になるという傾向が生じる。逆に、長纖維ウェブ/紙シート=1/19を超えて、紙シートの坪量が重くなると、紙シートを構成するパルプ繊維の全てが強固に長纖維と絡合しくくなり、得られる拭き布を湿润させて使用した場合に、パルプ繊維が脱落しやすくなる傾向が生じる。

【0013】長纖維ウェブの表面に紙シートを積層した

後、紙シートの表面から長纖維ウェブ側に向けて高圧水柱流を施す。即ち、積層物の紙シート側から長纖維ウェブ側へ高圧水柱流が貫通するようにして、高圧水柱流を施すのである。この高圧水柱流は、微細な直径のノズル孔を通して、高圧で水を噴出させて得られるものである。例えば、孔径 $0.01\sim3\text{mm}$ 程度のノズル孔を通して、 $20\sim150\text{kg}/\text{cm}^2$ 程度の圧力で水を噴出させて得られるものである。この水柱流を積層物に施すと、高圧水柱流は紙シートに衝突する。そして、紙シートはまず長纖維ウェブ上に密着し、次いでこの密着した状態で、紙シートの破壊が生じ、紙シートを構成するパルプ繊維を単離させ、パルプ繊維に曲げや捩れ等の変形を起こさせると共に、パルプ繊維に運動エネルギーを十分に与え、このパルプ繊維にランダムな運動を生じさせる。その結果、これらの複合作用によって、パルプ繊維と長纖維ウェブ中の長纖維とが絡み合い、更に、このパルプ繊維によって長纖維同士も絡合することになるのである。

【0014】以上のようにして得られた拭き布は、パルプ繊維と長纖維が絡合されて一体化したものである。そして、この拭き布には、所望に応じて、水やプロピレングリコール等の湿润剤、アルコール類やバラ安息香酸エステル等の抗菌剤、防黴剤、香料等の薬剤等が付与されて、使い捨て手拭き、ウェットティッシュ、ワイパー、使い捨て雑巾等として使用されるのである。

### 【0015】

#### 【実施例】

##### 実施例1

ポリプロピレン長纖維が集積されてなり、且つこのポリプロピレン長纖維相互間が自己融着された点融着区域を多数持つ長纖維不織布を準備した。この長纖維不織布を構成する長纖維の繊度は、2.5デニールであり、長纖維不織布の坪量は、 $20\text{g}/\text{m}^2$ であった。この長纖維不織布の表面に、針葉樹晒クラフトパルプ繊維で構成された紙シートを積層した。この紙シートは、乾燥させた針葉樹晒クラフトパルプ100重量部に対して、ポリアミド・エピクロルヒドリン樹脂を固形分で0.3重量部配合した製紙原料を用い、湿式抄紙して得られたものである。この紙シートは、JIS P 8135に示された方法で25mm巾の試験片について測定した湿润引張強さが $1.1\text{kqF}$ であり、JIS P 8124に示された方法で測定した坪量が $60\text{g}/\text{m}^2$ であった。そして、紙シートが上に位置し、長纖維不織布が下に位置するようにして、金網で形成された移送コンベア上に載置した。次いで、この積層物を $20\text{m}/\text{分}$ の速度で移送させながら、孔径 $0.12\text{mm}$ のノズル孔が $0.64\text{mm}$ の間隔で千鳥状に並んでいる高圧水柱流噴出装置を用いて、 $70\text{kg}/\text{cm}^2$ の水圧で高圧水柱流を噴出させ、紙シートの表面に高圧水柱流を施した。以上のようにして、紙シートを構成しているパルプ繊維と、長纖維不織布を構成している長纖維とが絡合して、一体化された拭き布を得た。

## 【0016】実施例2

ポリエチレンテレフタレート長繊維が集積されてなり、且つこのポリエチレンテレフタレート長繊維相互間が自己融着された点融着区域を多数持つ長繊維不織布を準備した。この長繊維不織布を構成する長繊維の纖度は、2.3デニールであり、長繊維不織布の坪量は、 $15\text{g}/\text{m}^2$ であった。この長繊維不織布の表面に、針葉樹晒クラフトバルブ纖維80重量%と広葉樹晒クラフトバルブ纖維20重量%の混合物で構成された紙シートを積層した。この紙シートは、乾燥させた針葉樹晒クラフトバルブ及び広葉樹晒クラフトバルブの混合物100重量部に対して、ポリアミド・エピクロロヒドリン樹脂を固形分で0.5重量部配合した製紙原料を用い、湿式抄紙して得られたものである。この紙シートは、JIS P 8135に示された方法で25mm巾の試験片について測定した湿潤引張強さが $0.70\text{kqf}$ であり、JIS P 8124に示された方法で測定した坪量が $35\text{g}/\text{m}^2$ であった。そして、紙シートが上に位置し、長繊維不織布が下に位置するようにして、金網で形成された移送コンベア上に載置した。次いで、この積層物を $20\text{m}/\text{分}$ の速度で移送させながら、孔径 $0.12\text{mm}$ のノズル孔が $0.64\text{mm}$ の間隔で千鳥状に並んでいる高圧水柱流噴出装置を用いて、 $50\text{kg}/\text{cm}^2$ の水圧で高圧水柱流を噴出させ、紙シートの表面に高圧水柱流を施した。以上のようにして、紙シートを構成しているバルブ纖維と、長繊維不織布を構成している長繊維とが絡合して、一体化された拭き布を得た。

## 【0017】実施例3

ポリプロピレン長繊維が集積されてなり、且つこのポリプロピレン長繊維相互間が自己融着された点融着区域を多数持つ長繊維不織布を準備した。この長繊維不織布を構成する長繊維の纖度は、2.5デニールであり、長繊維不織布の坪量は、 $10\text{g}/\text{m}^2$ であった。この長繊維不織布の表面に、針葉樹晒クラフトバルブ纖維で構成された紙シートを積層した。この紙シートは、乾燥させた針葉樹晒クラフトバルブ100重量部に対して、ポリアミド・エピクロロヒドリン樹脂を固形分で0.3重量部配合した製紙原料を用い、湿式抄紙して得られたものである。この紙シートは、JIS P 8135に示された方法で25mm巾の試

験片について測定した湿潤引張強さが $0.8\text{kqf}$ であり、JIS P 8124に示された方法で測定した坪量が $35\text{g}/\text{m}^2$ であった。そして、紙シートが上に位置し、長繊維不織布が下に位置するようにして、金網で形成された移送コンベア上に載置した。次いで、この積層物を $20\text{m}/\text{分}$ の速度で移送させながら、孔径 $0.12\text{mm}$ のノズル孔が $1\text{mm}$ 間隔で並んでいる高圧水柱流噴出装置を用いて、 $60\text{kg}/\text{cm}^2$ の水圧で高圧水柱流を噴出させ、紙シートの表面に高圧水柱流を施した。以上のようにして、紙シートを構成しているバルブ纖維と、長繊維不織布を構成している長繊維とが絡合して、一体化された拭き布を得た。

## 【0018】比較例1

JIS P 8135に示された方法で25mm巾の試験片について測定した湿潤引張強さが $0.03\text{kqf}$ であり、JIS P 8124に示された方法で測定した坪量が $40\text{g}/\text{m}^2$ である紙シートを用いる以外は、実施例1と同様の方法で拭き布を得た。この拭き布の製造中において、紙シートは著しく破壊され、バルブ纖維が飛散した。また、紙シートの切断により、連続操業が不可能となった。

## 【0019】比較例2

JIS P 8135に示された方法で25mm巾の試験片について測定した湿潤引張強さが $1.8\text{kqf}$ であり、JIS P 8124に示された方法で測定した坪量が $80\text{g}/\text{m}^2$ である紙シートを用いる以外は、実施例1と同様の方法で拭き布を得た。この拭き布の製造中において、紙シート上に高圧水柱流によって水がプール状に滞留し、この滞留した箇所に高圧水柱流が衝突すると、滞留した水が周囲に飛び散り、高圧水柱流処理後の拭き布は、その地合いが悪化すると共に、手触り感も悪く、柔軟性にも劣っていた。

## 【0020】比較例3

実施例1で使用した長繊維不織布をそのまま拭き布とした。

【0022】実施例1～3及び比較例1～4で得られた拭き布を下記のテストに供し、その品質を評価した。この結果を表1に示した。

【表1】

|     |   | 吸水性 | 拭き取り性 | 柔軟性 | 繰り返し使用性 | 均一性<br>(地合い) |
|-----|---|-----|-------|-----|---------|--------------|
| 実施例 | 1 | 5   | 5     | 5   | 5       | 5            |
|     | 2 | 5   | 5     | 5   | 5       | 5            |
|     | 3 | 5   | 5     | 5   | 5       | 5            |
| 比較例 | 1 | 2   | 3     | 2   | 4       | 2            |
|     | 2 | 2   | 2     | 2   | 4       | 2            |
|     | 3 | 1   | 1     | 4   | 5       | 2            |
|     | 4 | 5   | 4     | 2   | 1       | 5            |

## 記

1) 吸水性：拭き布の吸水性を目視による官能評価によって判定した。官能評価は、次の5段階で行なった。5…極めて速やかに水を吸水した。4…速やかに水を吸水した。3…吸水性は普通であった。2…ややゆっくりと水を吸水した。1…ゆっくりと水を吸水した。

2) 拭き取り性：拭き布を水に浸漬した後、軽く絞った状態で机を掠り、拭き取り性を目視による官能で評価した。官能評価は、次の5段階で行なった。5…拭き取り性が極めて優れている。4…拭き取り性が優れている。3…拭き取り性が普通である。2…拭き取り性がやや不良である。1…拭き取り性が不良である。

3) 柔軟性：拭き布の柔軟性を手指による官能で評価した。官能評価は次の5段階で行なった。5…極めて柔軟である。4…柔軟である。3…柔軟性は普通である。2…柔軟性がやや劣っている。1…柔軟性が劣っている。

4) 繰り返し使用性：拭き布を水に浸漬した後、軽く絞り、次いで手で揉むという操作を繰り返して、手指による官能で評価した。官能評価は、次の5段階で行なった。5…拭き布の強度は殆ど低下せず、十分に繰り返し使用可能であった。4…拭き布の強度は若干低下したものの、繰り返し使用可能であった。3…拭き布の強度が低下したが、数回程度の繰り返し使用には耐えられた。2…拭き布の強度が低下し、繰り返し使用可能とは言えなかつた。1…拭き布の強度低下が激しく、繰り返し使用は不可能であった。

5) 地合い（均一性）：拭き布の地合いを目視による官能で評価した。官能評価は、次の5段階で行なった。5…極めて均一である。4…良好である。3…普通である。2…やや不均一で地合いが劣っている。1…極めて不均一で地合いが劣っている。

【0023】実施例1～3で得られた拭き布と、比較例1～4で得られた拭き布とを比較すれば、明かなように、比較例1に係る方法においては、紙シートとして湿润引張強さの低い紙シートを用いたので、拭き布の製造中に紙シートが著しく破壊され、或いはパルプ纖維が飛

散したために、十分な量のパルプ纖維が長纖維と絡合しておらず、実施例1～3で得られた拭き布と比較して、吸水性や拭き取り性に劣るものであった。また、パルプ纖維が均一に長纖維と絡合されていないため、この拭き布は地合いが不均一となり、手触り感も悪かった。比較例2に係る方法においては、湿润引張強さの高い紙シートを用いたので、拭き布の製造中に紙シート上にプール状の水溜りができ、高圧水柱流がこの水溜りに衝突して、水が周囲に飛び散って、高圧水柱流処理後の拭き布に高濃度のパルプを含む水が付着するため、実施例1～3に係る方法で得られた拭き布と比較して、地合いの劣るものであった。更に、高圧水柱流が水溜りに作用するため、エネルギーが生じ、パルプ纖維が十分に単離して長纖維と絡合しないため、柔軟性に劣る拭き布しか得られなかつた。比較例3及び4で得られた拭き布は、長纖維とパルプ纖維とが絡合したものでないため、長纖維不織布よりなる比較例3に係る拭き布においては、吸水性や拭き取り性に劣るものであり、紙シートよりなる比較例4に係る拭き布においては、引張強度が極めて低く、繰り返し使用性に劣り、また柔軟性にも劣るものであった。

## 【0024】

【作用及び発明の効果】以上説明したように、本発明に係る拭き布の製造方法は、長纖維ウェブの表面に、ある特定範囲の湿润引張強さを持つ紙シートを積層して、高圧水柱流を施すものであるため、紙シートが高圧水柱流の圧力によって著しく破壊されるのを防止し、且つ紙シートを構成するパルプ纖維が空中に飛散するのを防止することができる。また、紙シートの湿润引張強さの上限を一定値に定めたので、紙シートが破壊されにくくて、紙シート上に高圧水柱流によるプール状の水が滞留するのを防止でき、このため高圧水柱流がプール状に滞留した水を周囲に飛び散らせて、得られる拭き布の地合いを低下させることを防止しうるという効果を奏する。更に、高圧水柱流がプール状に滞留した水に作用することを防止でき、高圧水柱流のエネルギーを少なくする

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ことができるため、紙シートを構成するバルブ繊維が十分に単離して、長繊維と均一に絡合し、柔軟性に優れた拭き布を得ることができるという効果を奏する。また、紙シートを構成するバルブ繊維が空中に飛散するのを防止しうるので、長繊維と絡合するバルブ繊維の量が減少しにくく、大量のバルブ繊維を長繊維と絡合することができる。従って、得られる拭き布に、大量のバルブ繊維を含有させることができ、吸水性や保水性、更には拭き取り性に優れた拭き布を得ることができるという効果を奏する。

【0025】また、ある特定範囲の湿潤引張強さを持つ紙シートを用いたので、拭き布の製造中に、紙シートが切断しにくく、紙シートを連続して供給することができる。従って、拭き布の製造を連続して合理的に行なえるという効果を奏すると共に、高圧水柱流による水やバルブ

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\* ブ繊維の飛散を防止しうるため、作業環境を常に清潔に保つことができるという効果も奏する。更に、使用した高圧水柱流を回収して再使用する場合には、本発明によればバルブ繊維が流出及び飛散しにくいので、回収した水中にバルブ繊維が混入しにくい。従って、再使用する前にフィルター材で通過しても、フィルター材で捕捉されるバルブ繊維の量が少なく、フィルター材の目詰まりを防止しうるという効果を奏する。依って、本発明に係る拭き布の製造方法を採用すれば、フィルター材の交換回数を減少させることができるので、長期間に亘る連続操業が可能となるという効果を奏するのである。一方、使用した高圧水柱流を回収しないで、そのまま廃棄する場合であっても、その廃液中におけるバルブ繊維の混入量が少ないので、環境破壊を起こしにくいという効果も奏する。

## フロントページの続き

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【手続補正書】

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【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】0007

【補正方法】変更

【補正内容】

【0007】

【課題を解決するための手段】本発明者等が、その後更に研究を進めた結果、湿潤引張強さが0.6kgfを超える紙シートを採用した場合にも、特開平5-253160号公報記載に係る発明と同様に、紙シートが著しく

破壊されたり、或いは紙シートを構成するバルブ繊維が飛散したりすることを抑制できることを見出し、本発明に到達したのである。即ち、本発明は、多数の長繊維が集積されてなる長繊維ウェブの表面に、JIS P 8 135に示された方法で25mm巾の試験片について測定した湿潤引張強さが、0.6kgfを超えて1.5kgf以下の範囲である紙シートを積層した後、該紙シートの表面から長繊維ウェブ側に向けて高圧水柱流を施すことにより、該紙シートを構成するバルブ繊維と該長繊維とを絡合させることを特徴とする拭き布の製造方法に関するものである。

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(21)Application number : 04-194760 (71)Applicant : NEW OJI PAPER CO LTD  
 (22)Date of filing : 29.06.1992 (72)Inventor : IKEZAWA HIDEO  
 WATANABE SHINOBU

## (54) PRODUCTION OF WIPING CLOTH

### (57)Abstract:

**PURPOSE:** To obtain a method for rationally producing a wiping cloth excellent in water absorptivity and wiping properties.

**CONSTITUTION:** The objective method for producing a wiping cloth is to prepare a continuous filament web in which many continuous filaments having 1-4 denier size are accumulated, laminating a paper sheet having preferably 10-100g/m<sup>2</sup> basis weight and a wet tensile strength within the range of 0.6kgf to 1.5kgf to the surface of the continuous filament web at preferably 1:(1-19) basis weight ratio of the continuous filament web to the paper sheet, then applying a high-pressure water columnar stream from the surface of the paper sheet toward the side of the continuous filament web in the laminate of the continuous filament web and the paper sheet and consequently affording the wiping cloth in which the continuous filaments and pulp fiber constituting the paper sheet are uniformly entangled. This continuous filament web has preferably 5-30g/m<sup>2</sup> basis weight and is preferably a continuous filament nonwoven fabric having many dot-fused areas. The wet tensile strength herein described is obtained by measuring a test specimen having 25mm width according to a method specified in JIS P8135.

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**CLAIMS**

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**[Claim(s)]**

**[Claim 1]** The wet tensile strength measured about the test piece of 25mm width by the approach shown in the front face of a continuous glass fiber web which it comes to pile up much continuous glass fibers JIS P8135 By giving a high-pressure water column style towards a continuous glass fiber web side from the front face of this paper sheet, after carrying out the laminating of the paper sheet which is the range of 1.5 or less kgves exceeding 0.6kgf(s), it is characterized by making the pulp fiber which constitutes this paper sheet, and this continuous glass fiber interlace, wipes, and is the manufacture approach of cloth.

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**[Translation done.]**

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## DETAILED DESCRIPTION

### [Detailed Description of the Invention]

[0001]

[Industrial Application] A disposable towel, wet tissue, a wiper, a disposable dustcloth, etc. wipe this invention, and it relates to the manufacture approach of cloth.

[0002]

[Description of the Prior Art] Conventionally, a disposable towel etc. wipes and what infiltrated water, drugs, etc. into the dry type pulp sheet which comes to pile up pulp fiber bulky is used as cloth. However, Ushiro who infiltrated water, drugs, etc. got wet and the dry type pulp sheet had the fault of reinforcement having been low and being easy to be torn while in use.

[0003] On the other hand, after accumulating the rayon fiber which is hydrophilic fiber, that into which water etc. was infiltrated is also used for the nonwoven fabric which combined between rayon fibers with the rubber system binder. this — since, as for cloth, between rayon fibers is combined by wiping, it is the high thing which gets wet and shows reinforcement. However, since it wiped and the rubber system binder contained on cloth, there was a fault that there was a nasty smell. Moreover, for the feel which the rubber system binder carried out coarsely, it wiped and the fault of being bad also had the feeling of use of cloth. For this reason, the attempt in which the nonwoven fabric which made between rayon fibers interlace is used without using a rubber system binder is also performed. To interlacement between rayon fibers, it is possible to give a water column style to the web on which the rayon fiber was accumulated. However, in order to fully give interlacement by the water column style, it might be said that there had to be much accumulation of a rayon fiber. That is, even if the comparatively big gap is formed between rayon fibers and the web with little accumulation of a rayon fiber gives a water column style, the water column style passes through a web easily through the gap, without colliding with a rayon fiber. That is, in order not to fully give kinetic energy to a rayon fiber, a rayon fiber does not fully exercise and, as a result, between rayon fibers does not interlace. Therefore, if you are going to make it fully interlace between rayon fibers, it is necessary to make [ many ] accumulation of a rayon fiber and to make small the fiber gap formed between rayon fibers. However, when accumulation of a rayon fiber was made [ many ], in order to have wiped, and for the thickness of cloth to have become thick and to have used it as a disposable towel etc., there was a fault acquired of becoming superfluous quality.

[0004]

[Problem(s) to be Solved by the Invention] For this reason, this applicant examined the technique in which interlacement of accumulation, such as a rayon fiber, by the water column style was attained at least. Consequently, in the web to which it comes to accumulate a rayon fiber etc., it considered and resulted in it being effective to take up the comparatively big gap between rayon fibers, and invention concerning Japanese Patent Application No. No. 204875 [ three to ] was proposed. It wipes and this invention is a thing about the manufacture approach of cloth which carries out the laminating of the tissue paper to the front face of a web which it comes to pile up continuous glass fibers, such as rayon continuous glass fiber, and is characterized by giving a high-pressure water column style. by this approach, the pulp fiber and continuous glass fiber which constitute tissue paper interlace well, between continuous glass

fibers is further interlaced well through pulp fiber, and absorptivity is good, and wet strength is high — it wipes and cloth is obtained.

[0005] However, when it wiped and cloth was manufactured by this approach, various kinds of troubles occurred during manufacture. For example, when a high-pressure water column style was given to tissue paper, tissue paper was destroyed remarkably and it might be said that pulp fiber dispersed in the air. It wiped and the uneven fault for which the pulp fiber which constitutes tissue paper does not interlace to continuous glass fiber and homogeneity according to this trouble, but it has the part where pulp fiber does not exist that only cloth was obtained occurred. Moreover, since pulp fiber dispersed in the air, the amount of the pulp [ wipe and ] fiber in cloth obtained decreased, and it might be said that absorptivity fell. Furthermore, although the high-pressure water column styles after use were collected, and were \*\*\*\*(ed) with the filter material, and it carried out the reuse, having used the water as the high-pressure water column style, when tissue paper was destroyed remarkably, or pulp fiber dispersed in the air and high-pressure water column styles were collected, pulp fiber mixed into it and there was a fault of the blinding of a filter material being intense and it becoming impossible to perform continuation operation over a long period of time. Moreover, when discharging as waste fluid as it is and pulp fiber is mixing without collecting high-pressure water column styles, there is also a possibility of causing environmental destruction by waste fluid. In addition, such a fault forms the fiber web containing pulp in the interior while opening staple fiber by the card method, after blending pulp with staple fiber, such as rayon, it gives a high-pressure water column style after that, and produces it also by the approach of making interlacement between staple fiber close according to an operation of pulp fiber. Since the fiber length of pulp fiber is short, if the pulp fiber which pulp fiber may disperse and is easy to exercise for a lot of freedom inside a fiber web is made to contain in case it opens by the card method, in case it will process by the high-pressure water column style, it is because pulp fiber is spilt out out of a fiber web.

[0006] this invention person etc. was going to solve the above-mentioned fault, and studied many things. Consequently, when wet tensile strength adopted the paper sheet which is 0.04–0.6kgf as tissue paper to be used, invention which relates that the above-mentioned fault can be solved to a header and Japanese Patent Application No. No. 89650 [ four to ] was proposed. Even if it carries out the laminating of a paper sheet and the continuous glass fiber web and gives a high-pressure water column style, while according to this invention it controls and has that a paper sheet is destroyed remarkably or the pulp fiber which constitutes a paper sheet disperses and pulp fiber and continuous glass fiber are comparatively interlaced by homogeneity, the pulp fiber in the used paper sheet was able to be effectively interlaced with continuous glass fiber, and can wipe, and cloth can be obtained. Furthermore, in case the high-pressure water column styles which are wiped and are used in the production process of cloth are collected, by decreasing the rate which pulp fiber mixes into it, it wipes, and it continues at a long period of time, and continuation operation of the manufacture of cloth can be carried out.

[0007]

[Means for Solving the Problem] As a result of this invention person's etc. advancing research further after that, also when the paper sheet with which wet tensile strength exceeds 0.6kgf(s) was adopted, a header and this invention were reached [ that it can control that a paper sheet is destroyed remarkably or the pulp fiber which constitutes a paper sheet like invention concerning Japanese Patent Application No. No. 89650 / four to / disperses, and ]. This invention on namely, the front face of a continuous glass fiber web which it comes to pile up much continuous glass fibers The wet tensile strength measured about the test piece of 25mm width by the approach shown in JIS P 8135 After carrying out the laminating of the paper sheet which is the range of 1.5 or less kgves exceeding 0.6kgf(s), by giving a high-pressure water column style towards a continuous glass fiber web side from the front face of this paper sheet It wipes and is the thing about the manufacture approach of cloth characterized by making the pulp fiber which constitutes this paper sheet, and this continuous glass fiber interlace.

[0008] First, in this invention, the continuous glass fiber web which it comes to pile up much continuous glass fibers is prepared. Here, as continuous glass fiber, well-known continuous glass fiber can be used conventionally, for example, rayon continuous glass fiber, polyolefine system

continuous glass fiber, polyester system continuous glass fiber, polyamide system continuous glass fiber, polyacrylic ester system continuous glass fiber, etc. can be used. In this invention, the continuous glass fiber web which the reason for using continuous glass fiber becomes from continuous glass fiber is because it excels in tensile strength or gestalt stability, when between fiber is interlacing rather than the staple fiber web which consists of a staple fiber. Moreover, as for the fineness of continuous glass fiber, it is desirable that it is 1–4 deniers. If the fineness of continuous glass fiber exceeds 4 deniers, the inclination for a feeling of use when the flexibility of a continuous glass fiber web fell and wipes and uses it as cloth to fall will arise. On the contrary, if the fineness of continuous glass fiber becomes less than 1 denier, the manufacture conditions of continuous glass fiber etc. will become strict, and the inclination to be hard coming to manufacture continuous glass fiber, as a result a continuous glass fiber web at high speed will arise. Moreover, as for the basis weight of a continuous glass fiber web, it is desirable that it is 5 – 30 g/m<sup>2</sup>. If the basis weight of a continuous glass fiber web exceeds 30 g/m<sup>2</sup>, even if it gives a high-pressure water column style to the laminated material of a paper sheet and a continuous glass fiber web towards a continuous glass fiber web side from a paper sheet The pulp fiber which constitutes a paper sheet will be in the condition to which it wiped and pulp fiber was unevenly distributed only in one side of cloth of being hard coming to move to the rear face (field which is not in contact with a paper sheet) of a continuous glass fiber web, and being obtained, and the inclination for the absorptivity in a field with little pulp fiber to fall will arise. On the contrary, if the basis weight of a continuous glass fiber web becomes less than two 5 g/m, the gestalt stability of a continuous glass fiber web will fall, and the inclination acquired to wipe and for the wet strength of cloth to fall will arise. Furthermore, when the gap between continuous glass fibers becomes large, a high-pressure water column style is given, pulp fiber flows out of the gap and the high-pressure water column styles after use are collected, a possibility that pulp fiber may mix in large quantities into it arises. In addition, the continuous glass fiber web used in this invention may be continuous glass fiber fleece of the shape of fleece which may be the so-called continuous glass fiber nonwoven fabric, and between continuous glass fibers has not combined in which between continuous glass fibers carried out self welding. It is desirable that the point welding area between continuous glass fibers carried out [ the area ] self welding uses especially what has been arranged in the shape of dispersion also among the former continuous glass fiber nonwoven fabrics. This reason is that it excels in flexibility and is easy to interlace to pulp fiber and fitness since self welding of between continuous glass fibers is not carried out but it is accumulated in the free condition in areas other than a point welding area while excelling in gestalt stability, since it has the point welding area as for which between continuous glass fibers is carrying out self welding.

[0009] The laminating of the paper sheet is carried out to the front face of the continuous glass fiber web prepared as mentioned above. An important thing is in the point which uses a thing with a certain specific wet tensile strength as this paper sheet by this invention. That is, the wet tensile strength measured about the test piece of 25mm width as a paper sheet by the approach shown in JIS P 8135 needs to use the paper sheet which is the range of 1.5 or less kgves exceeding 0.6kgf. It is good for wet tensile strength to use especially the paper sheet which is the range of 1.2 or less kgves preferably exceeding 0.6kgf(s). Since this paper sheet is in the inclination for the isolation and movement of pulp fiber by the high-pressure water column style to be controlled, compared with the paper sheet whose wet tensile strength is 0.6 or less kgves, as shown below, it is desirable to make severe the processing conditions of a high-pressure water column style. That is, in case make the number of the nozzle which spouts a high-pressure water column style increase, the injection pressure of a high-pressure water column style is made to increase or a high-pressure water column style is made to blow off on the paper sheet which moves, it is desirable to reduce the passing speed of the paper sheet and to lengthen the processing time by the high-pressure water column style. If the wet tensile strength of a paper sheet exceeds 1.5kgf(s), it is not only hard coming to interlace pulp fiber and continuous glass fiber, but the pulp fiber which constitutes a paper sheet by it cannot exercise easily, and it becomes inadequate isolating [ of the pulp fiber by the high-pressure water column style ], and even if it gives a high-pressure water column style, since [ to which it wipes and the

flexibility of cloth falls sharply ] it is obtained, it is not desirable. Moreover, if isolation of the pulp fiber which constitutes a paper sheet by the high-pressure water column style becomes inadequate, a high-pressure water column style stops being able to penetrate a paper sheet easily, and on a paper sheet, water will serve as a letter of a pool, it will pile up, and the energy fall of the high-pressure water column style given to the laminated material of a paper sheet and a continuous glass fiber web will be brought about. Furthermore, if water serves as a letter of a pool and it is piling up on a paper sheet, since the water which is piling up scatters around, the front stirrup which gives a high-pressure water column style will be obtained and wiped since the water which contained pulp at Ushiro's given process adheres and the conditions of cloth will fall by the high-pressure water column style, it is not desirable. Although especially the approach of making wet tensile strength of a paper sheet the specific range is not limited, it may blend general humid paper reinforcing agents, such as polyamide epichlorohydrin resin, the denaturation object and polyamine epichlorohydrin resin, melamine resin, or a urea-resin, for example.

[0010] Although the basis weight of the paper sheet to be used is the matter which can be determined as arbitration, it is desirable to use the paper sheet whose basis weight measured by the approach shown especially in JIS P 8124 is 10 – 100 g/m<sup>2</sup>. There is little absolute magnitude of pulp fiber that the basis weight of a paper sheet is less than two 10 g/m, it wipes and the inclination acquired to be hard coming to give the sufficient absorptivity and the water retention for cloth arises. On the contrary, if the basis weight of a paper sheet exceeds 100 g/m<sup>2</sup>, even if there is too much absolute magnitude of pulp fiber and it gives a high-pressure water column style to a paper sheet, the inclination to be hard coming to give the momentum of extent which can be interlaced with continuous glass fiber to one 1 pulp fiber will arise. Furthermore, the inclination for there to be too much absolute magnitude of pulp fiber, and it to be obtained and to wipe and for the flexibility of cloth to fall arises.

[0011] As pulp fiber which constitutes a paper sheet, a needle-leaf tree and broad leaf tree material can be used for mechanical pulp fiber, such as chemical pulp fiber which carried out digestion or grand pulp fiber, and thermomechanical-pulp fiber, by the kraft process, the ape fight method, the soda process, the polysulfide method, etc., being able to be in the condition of \*\* or non-\*\*, and being able to be independent, or mixing. the weight-mix ratio of softwood pulp fiber and hardwood pulp fiber — desirable — softwood pulp fiber / hardwood pulp fiber =100–20/80 – – it is the range of 100–40 / 0–60 most preferably. [ 0–80 ] If hardwood pulp fiber exceeds 80 % of the weight, the amount of disappearance of the pulp by the high-pressure water column style not only increases, but it will become the inclination for the flexibility of the sheet after interlacement to fall. Moreover, as for the consistency (it measures by the approach shown in JIS P 8118) of the paper sheet used for this invention, it is desirable that it is three or less 0.6 g/cm. When the consistency of a paper sheet exceeded 0.6 g/cm<sup>3</sup> and a high-pressure water column style is given from on a paper sheet, movement of pulp fiber is controlled and the inclination interlacement with continuous glass fiber and pulp fiber not only becoming less enough but it to be obtained and to wipe and for the flexibility of cloth to fall arises.

[0012] The laminating of this paper sheet is carried out to the continuous glass fiber web front face prepared beforehand. Under the present circumstances, the ratio of the basis weight of a continuous glass fiber web and the basis weight of a paper sheet has [ making it be the following ] a desirable thing. That is, it is desirable to make it the ratio of the basis weight of a continuous glass fiber web and the basis weight of the paper sheet measured by the approach shown in JIS P 8124 set to a continuous glass fiber web / paper sheet =1 / 1–19. A continuous glass fiber web / paper sheet = when it comes to less than 1/1, to the amount of continuous glass fiber, the amount of pulp fiber decreases relatively and the inclination acquired to wipe and for the absorptivity and water retention of cloth to fall arises. Moreover, to continuous glass fiber, when the amount of cheap pulp fiber decreases, it wipes and the inclination acquired for the cloth itself to become expensive arises. On the contrary, a continuous glass fiber web / paper sheet = it wipes, and if the basis weight of a paper sheet becomes heavy exceeding 1/19, when [ which used it, having made carry out humidity of the cloth ] it will be hard coming to interlace with continuous glass fiber all the pulp fiber that constitutes a paper sheet firmly and it

will be obtained, the inclination for pulp fiber to dedrop come to be easy arises.

[0013] After carrying out the laminating of the paper sheet to the front face of a continuous glass fiber web, a high-pressure water column style is given towards a continuous glass fiber web side from the front face of a paper sheet. That is, as a high-pressure water column style penetrates from the paper sheet side of laminated material to a continuous glass fiber web side, a high-pressure water column style is given. This high-pressure water column style lets the nozzle hole of a detailed diameter pass, with high pressure, makes water blow off and is obtained. For example, it lets the nozzle hole of about 0.01–3mm of apertures pass, and by the pressure of about 20–150kg/cm<sup>2</sup>, water is made to blow off and it is obtained. If this water column style is given to laminated material, a high-pressure water column style will collide with a paper sheet. And a paper sheet is first stuck on a continuous glass fiber web, subsequently, while making the pulp fiber which destruction of a paper sheet arises and constitutes a paper sheet isolate and making pulp fiber cause deformation of bending, a twist, etc., kinetic energy is fully given to pulp fiber and this pulp fiber is made to produce random movement in this condition of having stuck. Consequently, pulp fiber and the continuous glass fiber in a continuous glass fiber web will become entangled according to these compound operations, and continuous glass fibers will be further interlaced by this pulp fiber.

[0014] It was obtained as mentioned above and wipes, and pulp fiber and continuous glass fiber are interlaced and cloth is unified. and — this — it wipes, and according to a request, drugs, such as antimicrobial agents, such as wetting agents, such as water and propylene glycol, and alcohols, the Para benzoate, an antifungal agent, and perfume, etc. are given to cloth, and it is used for it as a disposable towel, wet tissue, a wiper, a disposable dustcloth, etc.

[0015]

[Example]

The continuous glass fiber nonwoven fabric with many point welding areas where example 1 polypropylene continuous glass fiber was accumulated, and it became, and self welding of between [ this ] polypropylene continuous glass fibers was carried out was prepared. The fineness of the continuous glass fiber which constitutes this continuous glass fiber nonwoven fabric was 2.5 deniers, and the basis weight of a continuous glass fiber nonwoven fabric was 20 g/m<sup>2</sup>. The laminating of the paper sheet constituted from needle-leaved-tree-bleached-kraft-pulp fiber by the front face of this continuous glass fiber nonwoven fabric was carried out. To the dried needle-leaved-tree-bleached-kraft-pulp 100 weight section, this paper sheet carries out wet paper making of the polyamide epichlorohydrin resin using the paper manufacture raw material which carried out 0.3 weight section combination by solid content, and is obtained. The basis weight which the wet tensile strength measured about the test piece of 25mm width by the approach by which this paper sheet was shown in JIS P 8135 measured by the approach which are 1.1kgf(s) and was shown in JIS P 8124 was 60 g/m<sup>2</sup>. And the paper sheet was located upwards, and as the continuous glass fiber nonwoven fabric was located downward, it laid on the migration conveyor formed at the wire gauze. Subsequently, making this laminated material transport the rate for 20m/, using high-pressure water column style blow off with which the nozzle hole of 0.12mm of apertures is alternately located in a line at intervals of 0.64mm, the high-pressure water column style was made to blow off with the water pressure of 70kg/cm<sup>2</sup>, and the high-pressure water column style was given to the front face of a paper sheet. It interlaced, and it was unified, the pulp fiber which constitutes the paper sheet as mentioned above, and the continuous glass fiber which constitutes the continuous glass fiber nonwoven fabric wiped, and cloth was obtained.

[0016] The continuous glass fiber nonwoven fabric with many point welding areas where example 2 polyethylene-terephthalate continuous glass fiber was accumulated, and it became, and self welding of between [ this ] polyethylene terephthalate continuous glass fibers was carried out was prepared. The fineness of the continuous glass fiber which constitutes this continuous glass fiber nonwoven fabric was 2.3 deniers, and the basis weight of a continuous glass fiber nonwoven fabric was 15 g/m<sup>2</sup>. The laminating of the paper sheet constituted from mixture of 80 % of the weight of needle-leaved-tree-bleached-kraft-pulp fiber and 20 % of the weight of broad-leaved-tree-bleached-kraft-pulp fiber by the front face of this continuous glass fiber nonwoven fabric

was carried out. To the mixture 100 weight section of the dried needle-leaved tree bleached kraft pulp and broad-leaved tree bleached kraft pulp, this paper sheet carries out wet paper making of the polyamide epichlorohydrin resin using the paper manufacture raw material which carried out 0.5 weight section combination by solid content, and is obtained. The basis weight which the wet tensile strength measured about the test piece of 25mm width by the approach by which this paper sheet was shown in JIS P 8135 measured by the approach which are 0.70kgf(s) and was shown in JIS P 8124 was 35 g/m<sup>2</sup>. And the paper sheet was located upwards, and as the continuous glass fiber nonwoven fabric was located downward, it laid on the migration conveyor formed at the wire gauze. Subsequently, making this laminated material transport the rate for 20m/, using high-pressure water column style blow off with which the nozzle hole of 0.12mm of apertures is alternately located in a line at intervals of 0.64mm, the high-pressure water column style was made to blow off with the water pressure of 50kg/cm<sup>2</sup>, and the high-pressure water column style was given to the front face of a paper sheet. It interlaced, and it was unified, the pulp fiber which constitutes the paper sheet as mentioned above, and the continuous glass fiber which constitutes the continuous glass fiber nonwoven fabric wiped, and cloth was obtained.

[0017] The continuous glass fiber nonwoven fabric with many point welding areas where example 3 polypropylene continuous glass fiber was accumulated, and it became, and self welding of between [ this ] polypropylene continuous glass fibers was carried out was prepared. The fineness of the continuous glass fiber which constitutes this continuous glass fiber nonwoven fabric was 2.5 deniers, and the basis weight of a continuous glass fiber nonwoven fabric was 10 g/m<sup>2</sup>. The laminating of the paper sheet constituted from needle-leaved-tree-bleached-kraft-pulp fiber by the front face of this continuous glass fiber nonwoven fabric was carried out. To the dried needle-leaved-tree-bleached-kraft-pulp 100 weight section, this paper sheet carries out wet paper making of the polyamide epichlorohydrin resin using the paper manufacture raw material which carried out 0.3 weight section combination by solid content, and is obtained. The basis weight which the wet tensile strength measured about the test piece of 25mm width by the approach by which this paper sheet was shown in JIS P 8135 measured by the approach which are 0.8kgf(s) and was shown in JIS P 8124 was 35 g/m<sup>2</sup>. And the paper sheet was located upwards, and as the continuous glass fiber nonwoven fabric was located downward, it laid on the migration conveyor formed at the wire gauze. Subsequently, making this laminated material transport the rate for 20m/, using high-pressure water column style blow off with which the nozzle hole of 0.12mm of apertures is located in a line at intervals of 1mm, the high-pressure water column style was made to blow off with the water pressure of 60kg/cm<sup>2</sup>, and the high-pressure water column style was given to the front face of a paper sheet. It interlaced, and it was unified, the pulp fiber which constitutes the paper sheet as mentioned above, and the continuous glass fiber which constitutes the continuous glass fiber nonwoven fabric wiped, and cloth was obtained.

[0018] Except using the paper sheet whose wet tensile strength measured about the test piece of 25mm width by the approach shown in example of comparison 1JIS P 8135 is 0.03kgf(s) and whose basis weight measured by the approach shown in JIS P 8124 is 40 g/m<sup>2</sup>, it wiped with the same approach as an example 1, and cloth was obtained. The paper sheet was remarkably destroyed during this manufacture that it wipes and is cloth, and pulp fiber dispersed in it. Moreover, continuation operating became impossible by cutting of a paper sheet.

[0019] Except using the paper sheet whose wet tensile strength measured about the test piece of 25mm width by the approach shown in example of comparison 2JIS P 8135 is 1.8kgf(s) and whose basis weight measured by the approach shown in JIS P 8124 is 80 g/m<sup>2</sup>, it wiped with the same approach as an example 1, and cloth was obtained. When it wiped, water piled up in the shape of a pool by the high-pressure water column style on the paper sheet during manufacture of cloth and the high-pressure water column style collided with this part in which it piled up, while, as for cloth, those conditions got worse by this water that piled up scattering around and wiping after high-pressure water column style processing, a feeling of a feel was also bad and inferior also to flexibility.

[0020] The continuous glass fiber nonwoven fabric used in the example of comparison 3 example

1 was wiped as it was, and it considered as cloth.

[0021] The paper sheet used in the example of comparison 4 example 1 was wiped as it was, and it considered as cloth.

[0022] It was obtained, and wiped with examples 1–3 and the examples 1–4 of a comparison, the following test was presented with cloth, and the quality was evaluated. This result was shown in Table 1.

[Table 1]

|             |   | 吸水性 | 拭き取り性 | 柔軟性 | 繰り返し使用性 | 均一性<br>(地合い) |
|-------------|---|-----|-------|-----|---------|--------------|
| 実<br>施<br>例 | 1 | 5   | 5     | 5   | 5       | 5            |
|             | 2 | 5   | 5     | 5   | 5       | 5            |
|             | 3 | 5   | 5     | 5   | 5       | 5            |
|             | 4 | 2   | 3     | 2   | 4       | 2            |
| 比較<br>例     | 1 | 2   | 2     | 2   | 4       | 2            |
|             | 2 | 1   | 1     | 4   | 5       | 2            |
|             | 3 | 5   | 4     | 2   | 1       | 5            |

Account 1 absorptivity: It wiped and the absorptivity of cloth was judged by organic-functions evaluation by viewing. Organic-functions evaluation was performed in the following five steps. 5 — Water was absorbed water very promptly. 4 — Water was absorbed water promptly. 3 — Absorptivity was common. 2 — Water was absorbed water a little slowly. 1 — Water was absorbed water slowly.

2) Wiping nature : it wiped, after being immersed in water, where cloth is extracted lightly, the desk was ground, and the organic functions by viewing estimated wiping nature. Organic-functions evaluation was performed in the following five steps. 5 — Wiping nature is extremely excellent. 4 — Wiping nature is excellent. 3 — Wiping nature is common. 2 — Wiping nature is a little poor. 1 — Wiping nature is poor.

3) Flexibility : it wiped and organic functions with a finger estimated the flexibility of cloth. Organic-functions evaluation was performed in the following five steps. 5 — It is very flexible. 4 — It is flexible. 3 — Flexibility is common. 2 — Flexibility is a little inferior. 1 — Flexibility is inferior.

4) Repeat usability : it wiped, and actuation of subsequently rubbing by hand was repeated [ cloth was lightly extracted, after being immersed in water. ], and organic functions with a finger estimated. Organic-functions evaluation was performed in the following five steps. 5 — It wiped, and the reinforcement of cloth hardly fell but was fully repeatedly usable. 4 — It was repeatedly usable, although it wiped and the reinforcement of cloth fell a little. 3 — Although it wiped and the reinforcement of cloth fell, it could be equal to about several repeat use. 2 — It wiped and it was not able to say [ reinforcement of cloth was able to fall and ] repeatedly that it was usable. 1 — It wiped, the fall of cloth on the strength was intense, and repeat use was impossible.

5) Conditions (homogeneity) : it wiped and the organic functions by viewing estimated the conditions of cloth. Organic-functions evaluation was performed in the following five steps. 5 — It is very uniform. 4 — It is good. 3 — It is common. 2 — It is a little uneven and conditions are inferior. 1 — It is very uneven and conditions are inferior.

[0023] In the approach of having wiped and having been acquired in cloth and the examples 1–4 of a comparison which was acquired in the examples 1–3 and which will start the example 1 of a comparison like [ it is \*\*\*\*\* and ] if it wipes and cloth is compared, Since the paper sheet with wet tensile strength low as a paper sheet was used, it wiped, and the paper sheet was remarkably destroyed during manufacture of cloth or pulp fiber dispersed, it was the thing from

which sufficient quantity of pulp fiber did not interlace with continuous glass fiber, but was obtained in the examples 1-3 and which wipes and is inferior to absorptivity or wiping nature as compared with cloth. since [ moreover, ] pulp fiber is not interlaced with continuous glass fiber by homogeneity — this — it wiped, and conditions became uneven and the feeling of a feel of cloth was also bad. Since the paper sheet with high wet tensile strength was used in the approach concerning the example 2 of a comparison. Since the water which it wipes, and the puddle of the letter of a pool is made during manufacture of cloth on a paper sheet, a high-pressure water column style collides with this puddle, water scatters around, and it wipes after high-pressure water column style processing, and contains high-concentration pulp in cloth adhered, it was the thing which was obtained by the approach concerning examples 1-3 and in which wipes and conditions are inferior as compared with cloth. Furthermore, in order that a high-pressure water column style might act on a puddle, the energy loss arose, in order that pulp fiber might fully isolate and might not interlace with continuous glass fiber, it was inferior to flexibility, and wiped and only cloth was obtained. It wiped, and since cloth was not the thing which was obtained in the examples 3 and 4 of a comparison and which continuous glass fiber and pulp fiber interlaced, it was the thing concerning the example 4 of a comparison concerning the example 3 of a comparison which consists of a continuous glass fiber nonwoven fabric which wipes, is inferior to absorptivity or wiping nature in cloth, and consists of a paper sheet which wipes, whose tensile strength is very low, and is inferior to repeat usability in cloth, and is inferior also to flexibility.

[0024]

[Function and Effect(s) of the Invention] It can prevent that the pulp fiber which prevents that carry out the laminating of the paper sheet concerning this invention in which it wipes and the manufacture approach of cloth has the wet tensile strength of a certain specific range in the front face of a continuous glass fiber web, and a paper sheet is remarkably destroyed by the pressure of a high-pressure water column style since it is what gives a high-pressure water column style, and constitutes a paper sheet disperses in the air as explained above. Moreover, since the upper limit of the wet tensile strength of a paper sheet was set to constant value, a paper sheet is hard to be destroyed, it can prevent that the water of the letter of a pool by the high-pressure water column style piles up on a paper sheet, the water with which the high-pressure water column style piled up in the shape of a pool for this reason is splashed around, and the effectiveness that the thing from which it is obtained and for which it wipes and the conditions of cloth are reduced can be prevented is done so. Furthermore, since a high-pressure water column style can prevent acting on the water which piled up in the shape of a pool and can lessen the energy loss of a high-pressure water column style, it fully isolates and interlaces to continuous glass fiber and homogeneity, and it wipes and the pulp fiber which constitutes a paper sheet does so the effectiveness excellent in flexibility that cloth can be obtained. Moreover, since it can prevent that the pulp fiber which constitutes a paper sheet disperses in the air, the amount of the pulp fiber interlaced with continuous glass fiber cannot decrease easily, and a lot of pulp fiber can be interlaced with continuous glass fiber. Therefore, it can obtain and wipe and cloth can be made to contain a lot of pulp fiber, it wipes and absorptivity, water retention, and the effectiveness that was further excellent in wiping nature that cloth can be obtained are done so.

[0025] Moreover, since the paper sheet with the wet tensile strength of a certain specific range was used, it wipes, and during manufacture of cloth, it is hard to cut a paper sheet and a paper sheet can be supplied continuously. Therefore, since scattering of the water by the high-pressure water column style or pulp fiber can be prevented while doing so the effectiveness that it wipes and manufacture of cloth can be performed rationally continuously, the effectiveness that work environment can always be kept clean also does so. Furthermore, since according to this invention pulp fiber flows out and cannot disperse easily when collecting and carrying out the reuse of the used high-pressure water column style, it is hard to mix pulp fiber in underwater [ which was collected ]. Therefore, even if it \*\*\*\* with a filter material before carrying out a reuse, the effectiveness that there are few amounts of the pulp fiber caught with a filter material, and the blinding of a filter material can be prevented is done so. Therefore, the

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